This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Previously Presented): A method of improving a thermal stability for cobalt salicide, comprising:

providing a substrate having a silicon layer thereon;

forming a cobalt layer over the silicon layer;

forming a TiN_x layer over the cobalt layer;

performing a first thermal process to form a cobalt salicide layer over the silicon layer, the performing of the first thermal process including diffusing cobalt into the silicon layer to form the cobalt salicide layer and diffusing nitrogen in the TiN_x layer into the cobalt salicide layer; and

removing a non-reactive cobalt layer,

wherein the TiN_x layer includes x atoms of nitrogen for each atom of titanium in a TiN_x molecule, and a value of x is greater than 0.9.

Claim 2 (Original): The method of claim 1, further comprising:

performing a second thermal process,

wherein the second thermal process is performed after the removing of the non-reactive cobalt layer.

Claim 3 (Original): The method of claim 1, wherein the TiN_x layer is formed by a sputtering process.

Claim 4 (Original): The method of claim 3, wherein a gas used in the sputtering process comprises N_2 and Ar.

Claim 5 (Original): The method of claim 4, wherein a ratio of N_2 to Ar in the gas used in the sputtering process is approximately 3:1.

Claim 6 (Original): The method of claim 1, wherein the TiN_x layer is formed to a thickness in a range of approximately 25 angstroms to approximately 100 angstroms.

Claim 7 (Previously Presented): A method of forming cobalt salicide, comprising:

providing a layer of silicon;

forming a layer of cobalt over the layer of silicon;

forming a layer of TiN_x over the layer of cobalt, wherein a value of x is greater than 0.9; and

performing a first thermal process to form a layer of cobalt salicide over the layer of silicon, the performing of the first thermal process including diffusing cobalt into the silicon layer to form the layer of cobalt salicide and diffusing nitrogen in the TiN_x layer into the cobalt salicide layer.

Claim 8 (Original): The method of claim 7, further comprising:

removing a layer of non-reactive cobalt; and

performing a second thermal process, the second thermal process being performed to decrease a resistance of cobalt salicide formed in the performing of the first thermal process.

Claim 9 (Original): The method of claim 7, wherein the forming of the layer of TiN_x is by a sputtering process.

Claim 10 (Original): The method of claim 9, wherein the sputtering process is accomplished with a gas comprised of N_2 and Ar.

Claim 11 (Original): The method of claim 10, wherein the ratio of N_2 to Ar in the gas comprised of N_2 and Ar is approximately 3:1.

Claim 12 (Original): The method of claim 1, wherein the TiN_x layer is formed to a thickness in a range of approximately 25 angstroms to approximately 100 angstroms.

Claim 13 (Previously Presented): A method for forming cobalt salicide having improved thermal stability, comprising:

providing a silicon layer, the silicon layer being one of a substrate formed of silicon and a layer of silicon formed over a substrate;

forming a cobalt layer over the silicon layer;

forming a TiN_x layer over the cobalt layer, wherein a value of x is greater than 0.9;

performing a first thermal process, the first thermal process diffusing cobalt into the silicon layer to form a layer of cobalt salicide and diffusing nitrogen in the TiN_x layer into the layer of cobalt salicide;

removing any unreacted cobalt; and

performing a second thermal process to reduce a resistance of cobalt salicide formed in the performing of the first thermal process.

Claim 14 (Original): The method of claim 13, wherein the TiN_x layer is formed over the cobalt layer by performing a sputtering process.

Claim 15 (Original): The method of claim 14, wherein the sputtering process is performed with a gas comprising N_2 and Ar.

Claim 16 (Previously Presented): The method of claim 15, wherein the ratio of N_2 to Ar in the gas comprising N_2 and Ar is approximately 3:1.

Claim 17 (Original): The method of claim 13, wherein the TiN_x layer is formed over the cobalt layer to a thickness in a range of approximately 25 angstroms to approximately 100 angstroms.